Hanford Reach
Hanford Site Employee News
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WSCF meets challenges of faster cleanup

When challenged to increase its ability to analyze headspace gas samples, Fluor Hanford's Waste Sampling and Characterization Facility applied creativity to speed up the process.

Hanford is sending more shipments than ever to the Waste Isolation Pilot Plant in New Mexico, where transuranic waste is placed more than 2,000 feet underground in a bedded salt formation that has remained geologically stable and free of groundwater for 225 million years. The salt seals the waste from the environment and shields the radioactivity in the containers.

The first shipment was sent from Hanford to WIPP in July 2000, and by April 2003 a total of 14 shipments had been sent. As a result of acceleration, the total had more than doubled by this past June 23, when WIPP received the 29th Hanford shipment.

Fluor Hanford Waste Management conducts several characterization processes to compliantly prepare waste for shipment to WIPP. Headspace gas sampling analysis characterizes organic vapors in the area between the contents of the container and the lid. Containers are kept in a heated environment for three days to prepare them for sampling. Samples must be analyzed by a WIPP-certified laboratory.

The Waste Sampling and Characterization Facility is a full-service Hanford Site laboratory analyzing low-radioactivity and non-radioactive samples. Rigid quality controls govern WIPP work being done at WSCF. Certification is maintained by rigorous annual assessments and by regular analysis of Performance Demonstration Program samples provided by WIPP to monitor certified labs.

Before undertaking a task in a radiation buffer area, Briana Colley assembles sampling equipment at the WRAP facility. Health physics technician Dominic Furino also conducts pre-job activities, and both will don the required personal protective equipment, as discussed in the pre-job safety meeting,a before starting work. Colley is one of six WSCF sampling experts assigned to assist operations personnel with headspace gas sampling.

Weekly quota quadrupled

As part of Fluor Hanford's accelerated cleanup, WSCF was asked to increase its weekly headspace gas sample analyses from 18 to 80, according to WSCF analytical manager Scot Fitzgerald.

A team was assembled to increase production and decrease turnaround times. Members Bruce Hey, Joe Hale and Markus Stauffer focused on gaining efficiency by speeding up the analysis rather than increasing the number of staff members or instruments.

The team made several modifications to the gas chromatograph/mass spectrometer analytical system — highly specialized equipment for detecting organic vapors. Instrument modifications and process improvements allow a batch of up to 20 samples to be analyzed in 12 hours, compared with the prior average of three days.

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A key change reduced the length of time for heating and cooling cycles during analysis. A small box-like cryogenic trap was attached to the instrument. Instead of subjecting the entire oven of the gas chromatograph to very low temperatures for a required part of the analytical process, cryogenic cooling can be applied to the box only, causing the vapors to congeal into a liquid or solid state.

Speeding up the process

WIPP approved implementing the proposed changes and tested the new configuration in a surveillance audit using "pipe overpack containers," or POCs — specialized containers used for some of the waste from the Plutonium Finishing Plant. The test was a success, bringing WIPP approval of WSCF's new configuration.

"The WSCF staff successfully demonstrated headspace gas sampling of pipe overpack containers for the DOE Carlsbad Office auditors," said Duane Renberger, Analytical Services director. "This involved teams from the Waste Management TRU program, the Waste Receiving and Processing facility and WSCF."

"The pipe overpack container headspace gas sampling surveillance by the Carlsbad Field Office was a huge success by any measure," said Rick Dunn, Waste Management's director of TRU Programs. "This is a significant achievement — it helps position us to ship about 2,400 pipe overpack containers projected from the Plutonium Finishing Plant over the next year. We have already completed the headspace characterization for a population of 900 of these POCs."

Karola Kover, Project Office lead, said, "The surveillance was as realistic as possible. This success will help us move forward with our accelerated schedule for sampling headspace gases."

An expert staff

The Waste Sampling and Characterization Facility has a group of sampling experts assisting operations personnel with headspace gas sampling at T Plant and WRAP — Briana Colley, Len Pingel and Larry Lockard, along with new members Cynthia Johnson, Jim Douglas and Jim Grohs — supporting increased production needs for waste destined for WIPP.

"I'm very proud of the staff of the laboratory for working smart to make first-of-a-kind changes that speed up the processes for analyzing headspace gas samples," said Christina Caprio, WSCF project manager. "WSCF wants to make its contribution to the WIPP program and help Hanford meet the challenge of preparing thousands of drums of transuranic waste for shipment and permanent disposal."

WSCF is located in the heart of the Hanford Site's central plateau, down the road from the Hanford Fire Department's Central Fire Station. Operated by Fluor Hanford's Analytical Services organization for the DOE Richland Operations Office, WSCF is staffed by a mixture of chemists and chemical technologists providing accredited radiological, organic and inorganic analyses supporting many Hanford Site projects. ■